CLAIMS

1. A method for producing a light-emitting device comprising:

a step of electrically connecting a first electrode provided on one main surface of a semiconductor substrate (element substrate) through a light-emitting layer, and a first lead of a lead frame, so as to oppose each other;

a step of electrically connecting a second electrode provided on the rear surface of a surface provided with the light-emitting layer of said element substrate, and a second lead of said lead frame;

a step of encapsulating a connecting part of said first electrode and said first lead, and said second electrode, and an electrode part of the second lead, with a transparent resin; and

a step of producing a discrete edge by cutting said first lead and the second lead from the above-described lead frame;

characterized in that a film of joining material (joining material film) made of an alloy or a single metal, is formed on the first electrode of said light-emitting element, and a pattern to reduce spreading of said joining material is formed on an element mounting part of said first lead, in advance of the step of electrically connecting the first electrode of said light-emitting element and said first lead.

2. The method for producing the light-emitting

device

according to Claim 1, characterized in that said joining material film is formed in advance by depositing fine particle joining material on said first electrode.

3. The method for producing the light-emitting device

according to Claim 1, characterized in that said joining material film is formed in advance by plating.

4. The method for producing the light-emitting device according to Claim 1, characterized in that said joining material film is made in advance by forming joining material molded in a thin film shape on said first electrode.

5. The method for producing the light-emitting device according to any one of Claims 1 to 4, characterized in that said joining material film is formed in advance by a joining material having melting point higher than melting point of a joining material used in surface mounting said light-emitting device.

6. The method for producing the light-emitting device according to any one of Claims 1 to 5, characterized in that said joining material film is formed in advance by a gold-tin alloy.

7. The method for producing the light-emitting device according to any one of Claims 1 to 6, characterized in that thickness of a light-emitting

layer of said light-emitting element is sufficiently smaller compared with thickness of said element substrate.

8. The method for producing the light-emitting device according to any one of Claims 1 to 7, characterized in that a pattern of said lead frame consists of a pattern with a plurality of grooves crossing mutually inside a joining area wherein the first electrode of said light-emitting element is placed.

9. The method for producing the light-emitting device according to Claim 8, characterized in that said plurality of grooves extend outside said joining area, or crossing with other grooves extending outside said joining area.

10. The method for producing the light-emitting device according to any one of Claims 1 to 7, characterized in that a pattern of said lead frame consists of a pattern provided with a plurality of insular convex portions in a concave portion, the entire periphery of or a part of the periphery thereof being located outside said joining area.

11. The method for producing the light-emitting device according to Claim 10, characterized in that the upper surfaces of said insular convex portions are flat.

12. The method for producing the light-emitting device according to any one of Claims 8 to 11,

characterized in that depth of said grooves or height of said convex portions is larger than thickness of the joining material film formed on the first electrode of said light-emitting element.

13. A light-emitting device comprising:

a first electrode provided on one main surface of a semiconductor substrate through a light-emitting layer;

a light-emitting element provided with a second electrode on the rear surface of a surface provided with said light-emitting layer;

an element mounting part opposing to the first electrode of said light-emitting element; and

a transparent resin encapsulating a first lead electrically connected to said first electrode, a second lead electrically connected to a second electrode of said light-emitting element, and a surrounding of said light-emitting element;

characterized in that the first electrode of said light-emitting element, and the element mounting part of said first lead, are electrically connected by a joining material made of an alloy or a single metal.

14. The light-emitting device according to Claim 13, characterized in that a plurality of grooves crossing in a joining area wherein the first electrode of said light-emitting element is placed, are provided on the element mounting surface of the element mounting part of said first lead.

15. The light-emitting device according to Claim 14, characterized in that said plurality of grooves extend up to outside said joining area, or crossing with other grooves extending up to outside said joining area.

16. The light-emitting device according to Claim 13, characterized in that a concave portion, having a plurality of insular convex portions, is provided on the element mounting surface of the element mounting part of said first lead, and that the entire periphery or a part of the periphery of said concave portion is located outside said joining area.

17. The method for producing the light-emitting device according to Claim 16, characterized in that the upper surfaces of said insular convex portions are flat.

18. The light-emitting device according to any one of Claims 13 to 17, characterized in that said joining material is made of a gold-tin alloy.